

1 24. IN-STREAM SEDIMENT DETENTION BASINS – [Low]

Supplement ideas from Sand and Gravel Mining document white paper. This will be a technique in that guideline.

1.1 Introduction

1.1.1 Description of Technique

General description of technique and applications: creating sediment “traps” to retain sediment for storage or removal. Common reasons for sediment removal include excess sediment input in upstream reaches, excess localized deposition caused by local infrastructure (such as bridges), and general channel bed aggradation. The latter two conditions may or may not be associated with elevated sediment inputs to the system.

Functions: To remove excess sediment - allowing for balanced sediment transport.

Indicate that sediment traps are a technique of last resort when source control is not possible and other, more natural techniques have been eliminated. Most are temporary until a better solution is developed.

Reference to Sand and Gravel Mining white paper.

1.1.2 Physical and Biological Effects

Scour and deposition: depositional reaches, channel aggradation, sedimentation of habitat features, interruption of bedload and scour of d/s reach, problems posed by fine sediment (if fine sediment is to be trapped...most traps primarily retain gravel/cobble sized materials).

1.1.3 Application of Technique

- Transport Reach vs. Depositional Reach: Sediment supply vs. transport rates
- Alluvial channels
- Non-Alluvial channels
- Storage vs. removal of trapped sediment
- Maintaining channel cross-section in depositional areas

1.2 Scale

Small streams vs. large rivers

1.3 Risk and Uncertainty

Risk to public safety

Urban vs. non-urban

Risk to adjacent property and infrastructure

1.4 Data Collection and Assessment

- Biological and geomorphic assessment of habitat needs and sediment transport/deposition characteristics in subject reach.
- Hydrology and hydraulics, including analysis of sediment transport and deposition
- Fluvial Geomorphic Assessment and History
- Watershed Processes and History. Identify sediment sources and reasons why source control is not possible.

1.5 Methods and Design

- Methods: Describe several methods for applying technique. Reference Sand and Gravel Mining white paper.
- Describe storage only, vs. storage and removal of sediment
- Design: Include size, shape, and location of basin and hydraulic evaluation of result/impact
- Include permanent bypass to be used during maintenance
- Establish pad for excavator to dig out trap and trucking access to site for removal of sediment.
- Include permanent method to drain pond and fish before maintenance.
- Discuss uncertainty in design

1.6 Project Implementation

1.6.1 Permitting

- Justification for trap
- Project Volumes (Cut and Fill), Construction Design and Methods
- Construct Drawings, Plan Views and Maps
- Sediment Control Plan
- Heavy Equipment Fueling Areas and Spill Plan
- Access Area Rehabilitation Plans
- Life of project (nearly all sediment traps are temporary)

1.6.2 Construction

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Fish Species Work Window and Construction Timing

Clearly mark all weirs and structural elements that can be buried by deposited sediment.

Equipment Access Areas

1.6.3 *Cost Estimation*

Variability and range of excavation and sediment removal costs

1.6.4 *Monitoring and Tracking*

- Section and Profile Data
- Bed Substrate Data
- Quantity of sediment removed and size distribution
- Photo Points
- Reach Based Fish Snorkeling
- Spawning Surveys, document location of redds to detect impacts to d/s reach

1.6.5 *Contracting Considerations*

Time and Materials vs. Construction Contracting

Contractor Experience

1.7 *Operations and Maintenance*

Relative to monitoring and objectives.

Relative to sediment removal vs. storage only

Removal of the facility

1.8 *Examples*

Five well-documented WDFW sediment detention basin projects on tributary streams.

Conceptual drawing created by Bob Barnard

1.9 *References*

References cited in this technique so it is a stand-alone pullout.

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1.10 Photo and Drawing File Names

List filenames and file locations of any photos and drawing files associated with this technique